**Infectious Disease Epidemiology Section**
**Office of Public Health, Louisiana Dept of Health & Hospitals**
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**www.oph.dhh.state.la.us**

# MENINGITIS

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Meningitis is an inflammation of the meninges with increased intracranial pressure, increased WBCs in CSF (pleocytosis ) usually secondary to infection in the pia-subarachnoid space and ventricles, leading to neurologic sequelae and abnormalities.

The incidence is about 15 cases /100,000 population per year (3 for bacterial, 11 for viral and 1 for others). It affects all ages, from neonate to geriatric ages.

**Clinical presentation**

- Fever
- Headache
- Neck stiffness, nuchal rigidity, meningismus
- Photophobia
- Altered mental status, lethargy, stupor, coma
- Vomiting, nausea
- Rash: petechial associated with meningococcal infection
- Myalgia
- Cranial nerve abnormality (unilateral)
- Papilledema, dilated, nonreactive pupil(s)
- Seizures, posturing: decorticate/decerebrate

- Physical examination findings of Kernig's sign and Brudzinski's sign in adults with meningitis are often not helpful in determining meningeal inflammation

**Etiology**

Most meningitis are due to bacteria or viruses. Other causes are rare such as carcinomatous meningitis, intracranial tumors, medications (some antibiotics and Nonsteroidal anti-inflammatory agents), systemic illnesses (lupus).

The most common causes of **bacterial** meningitis depend on the age of the patients.
- Neonates (0-1month): group B streptococci, Escherichia coli, Klebsiella sp., Listeria monocytogenes
- Infants (1-3 months): group B streptococci, Escherichia coli, Listeria monocytogenes, Streptococcus pneumoniae, Neisseria meningitidis, Hemophilus influenzae,

Infants through adolescence (3 months-18 years): Neisseria meningitidis, Hemophilus influenzae, Streptococcus pneumoniae
- Adults: Neisseria meningitidis, Streptococcus pneumoniae
- Elderly: Streptococcus pneumoniae, Neisseria meningitidis, Listeria monocytogenes, Gram-negative bacilli.

Other rare causes of bacterial meningitis include anthrax, enterobacteria, enterococci, leptospira, Lyme disease, rickettsial diseases, staphylococci, syphilis, tuberculosis.

The viral causes of **viral** meningitis: Enterovirus, mumps, measles, arboviruses, herpes (simplex and zoster), HIV, lymphocytic choriomeningitis virus, adenovirus, CMV, parainfluenza virus types 2 and 3, influenza virus.

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**CSF examination**

| CSF | Normal | Bacterial Meningitis | Viral Meningitis |
|---|---|---|---|
| **Opening Pressure** | 70-180 mm $H_2O$ | Normal to increased | Usually normal |
| **Protein** | 15-45 mg/dL | Increased | Normal to increased |
| **Glucose** | 45-80 mg/dL | Decreased | Normal to decreased |
| **WBC Count** | 0-10 /$mm^3$ | 100 to 10,000 | 100 to 1,000 |
| **Predominant Cells** | Mononuclear | Polymorphonuclear Neutrophiles 80% | Lymphocytes |
| **Bacteria on Gram stain** | Negative | Positive 60%-90% | Negative |
| **Bacterial culture** | Negative | Positive 65%-90% | Negative bacterial culture |
| **CSF bacterial antigen** | | 50% to 100% sensitivity | Negative |

**Surveillance**

Only some specific meningitis are reportable:
• All viral meningitis (enteroviral, arboviral, meningitis presumed of viral etiology or aseptic meningitis)
• Meningococcal meningitis
• Hemophilus influenzae meningitis
• Meningitis due to a reportable disease: anthrax, enterobacteria (vancomycin resistant), listeria, Lyme disease, methicillin resistant staphylococcus aureus, rickettsial diseases, syphilis, tuberculosis.

**Bacterial meningitis in school**

If a case of bacterial meningitis (not meningococcal) has been diagnosed in a school, it is not necessary to send letters to parents since there is no preventive measures to be taken. However, if the word went around that there was a case of meningitis, it may be useful to send out a letter to parents in order to prevent rumors and panic. The school authorities are responsible for making this decision. Below is a model letter:

____/____/____

Dear Parents and Students:

We have received word that a senior at the school has been diagnosed with bacterial meningitis. He is currently receiving treatment. Health personnel have identified those persons whom they consider to be close contacts, have notified them of the situation, and have treated those who were in need of treatment.

The bacteria that cause meningitis are spread by direct close contact with the discharges from the nose or throat of an infected person. Fortunately, **none of the bacteria that cause meningitis are very contagious**, and they are not spread by casual contact or by simply breathing the air where a person with meningitis has been.

The symptoms of meningitis are high fever, headache, and stiff neck which can develop over several hours or which may take 1 to 2 days. Other symptoms include nausea, vomiting, discomfort looking into bright lights, confusion, and/or sleepiness.

Should any parent have concern regarding their son or if they begin to exhibit symptoms of the disease they should contact their primary care physician.

Once again, **none of the bacteria that cause meningitis are very contagious**, and they are **not** spread by casual contact or by simply breathing the air where a person with meningitis has been.

If you have any questions or concerns regarding this matter, please contact Fr. Mike Conway, SDB at the school.

Sincerely,

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Principal